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FARM SORTING OF FLEECE WOOL for Market

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SUMMARY

Ohio wool marketing agencies have been confronted with objections of textile mill wool buyers who claim that foreign wools meet their requirements more satisfactorily than Ohio wools. Part of these objections result from the method followed by Ohio farmers preparing the wool for market.

The major objective of this project is to develop improved methods of putting up Ohio's wools and to determine the difference in returns using alternative methods. In order to accomplish this objective, data were assembled from processors and handlers on the major changes needed in the method of putting up fleece state wools to meet the mill requirements. A modified (new) shearing procedure designed to incorporate these needed changes was developed.

In order to evaluate the practicability of the new procedure, a group of professional shearers was selected and trained in the new method. These shearers then sheared out a sample of 27 farm flocks containing approximately 3,100 sheep. Data were collected on time required using the "new" and "old" methods, the difference in manhour labor required, the amount of various grades obtained and other relevant data.

Analysis of these data yielded the following results:

1. The difference in the average time taken to position the sheep for the two methods of shearing was less than 1.1 seconds. This difference is not statistically significant.
2. The difference in average time taken per sheep for the shearing operation, between the two shearing methods, was only 0.04 minutes. This is not statistically significant.
3. The average time required for all shearers for sorting under the new method was 57.45 seconds, per fleece. No sorting was required under the old method.
4. The difference in average time used for tying fleeces for all shearers was 5.78 seconds. The average time was less for the new method of shearing.

5. It took an average of 51 seconds more per fleece to put up the new package.

6. The cost differentials between the various operations for total shearing operation are summarized as follows:

Operation	Time difference (in Seconds)	Cost difference (in Cents)
Positioning	— 1.1 less for new	—0.1375 less for new
Shearing	— 0.04 less for new	—0.0050 less for new
Tying	— 5.78 less for new	—0.7225 less for new
Sorting	+57.45 more for new	+7.1812 more for new
Total Approximation	+50.53 more for new	+6.3162 more for new

These data show an additional cost of 6.3 cents per fleece at the farm using the new method.

7. It cost 0.0103 cents more per pound for warehouse grading and sorting of the project wool than for similar lots of wool put up in the old way.

8. It cost a total of 7.3 cents more per fleece to put wool up using the new method as compared with the old method.

9. The study showed that it was possible to sort wool on the farm with a fair degree of uniformity with shearers doing the sorting if the desired procedures were demonstrated and some supervision in the field was provided.

10. The lot of the 22,400 pounds of project wool at Boston yielded a gross return of $382.92 above a like quantity of wool prepared under regular methods.

11. After the additional expenses were deducted, the lot of project wool yielded a net gain of $102.62 or approximately 0.5 cents per pound above the return for similar wool put up under the old method.

12. Results of the wool offering on the Boston wool market revealed two important points: (a) that wool put up in an improved package will be accepted by mills on its improved merit, and (b) that large quantities of homogeneous sorts must be put up if the active competitive bidding essential for profitable disposition is to be obtained.

INTRODUCTION

Ohio wools currently are sheared and handled much as they were 60 to 80 years ago. The only improvement in shearing was brought about by the development and improvement in the design of power shearers. Little has been done with the wool itself in better fitting it to meet processor specifications. Textile mills, generally, want to purchase wool that is uniform in staple length and fiber (diameter) size. In addition, "feel" and fiber strength are important.

At present, domestic wools generally are sold at a lower market price per pound (clean basis) than foreign wool of a similar grade. This difference may be explained partly by the difference in cost of processing wool in preparation for milling. Foreign wool requires less hand sorting and has a lower shrink. The higher percentage of shrink of domestic as compared with foreign wool is due largely to the presence of vegetable matter, manure, and suint tags. Generally, most of this has been removed from foreign wool prior to exporting. Also, most of the short, coarse, and black fibers are separated from foreign wool prior to exporting.

In contrast with the lack of change in the wool marketing system, the textile industry has undergone dynamic changes. High wage rates, high-speed machinery, and exacting production specifications all have had their impact on the textile industry. As the textile spinning and weaving equipment became more automatic, a higher quality and more standardized fiber was needed. Consumers demand that the finished products have a more durable finish, lighter weave, shrink resistance, and high moisture absorption qualities.

With improvements in textile industrial equipment, many textile mills maintain that they must follow the old practice of sorting and grading domestic wool by the fleece to insure control of the grade variations in meeting requirements of their blends from day to day. Observations of mill graders and sorters in operation suggest that this "flexibility" in selecting grades of wool for blending is not generally necessary and that the sorting is not as complete as is sometimes believed.

Previous research in the wool marketing field has been directed mainly to territorial wools. The problems in fleece wool states differ from territorial wool state problems. The main point of difference is that farm flocks are smaller and often little attention is given to fleece preparation prior to marketing. For many years in the fleece wool states, the emphasis has been on producing quality lambs. Little effort

has been devoted to wool improvement because it has been felt that wool is a by-product of the sheep industry. As a result, quality of the wool clip has deteriorated from year to year.

PURPOSE

The main purposes of this study are:

1. To develop an improved method of putting up fleece wool which will better meet mill requirements.
2. To compare costs for the two methods of shearing by separate operations—positioning and shearing the sheep, sorting and tying the wool and warehouse grading of the project wool.
3. To ascertain a market valuation and textile mill buyer acceptance for wools prepared in this manner.
4. To determine the type of additional research needed in this area.

METHODS AND PROCEDURE

In accomplishing the outlined objectives, these procedural steps were followed:

1. A number of textile mills were contacted to obtain their ideas on the desired changes in market preparation of grease wool and improvements in wool put up which are likely to be most rewarding.
2. Alternative methods were developed and tested. This bulletin is mainly a report of the results of on-the-farm sorting of wools with trained shearers doing the sorting.
3. In a selected four county area, cooperation of sheep producers and sheep shearers was obtained in preparing their annual wool clip following a method demonstrated as most potentially desirable for fleece wool states.
4. Cost and time study data were collected on preparing wool clip and shearing sheep the new suggested method compared with the old.
5. Cost and time data were collected on grading and sorting a test lot of (project) wool to compare it with the grading and sorting of fleece wool as currently handled by Ohio Wool Growers Cooperative.
6. Market valuation of pilot lot of wool was obtained by marketing this wool through regular channels.
7. The collected data were analyzed and are used as a basis for suggesting practices which can be utilized economically by sheepmen in fleece wool states and suggesting areas where additional research is needed in developing improved wool preparation and marketing methods.

TEXTILE MILLS' REACTIONS TO CURRENT DOMESTIC PREPARATION METHODS

Several textile mills in the Boston area were contacted to obtain their views and reactions to proposed changes to wool put-up from the fleece wool states.

The principal criticisms given by textile mills pertaining to the present domestic wool put-up included:

1. Tags often are tied in with the fleece. Top makers and manufacturers prefer to have tags removed from the fleece and packed separately.
2. Fleeces often are tied with excessive amounts of paper twine. Fleeces tied with other than a minimum amount of paper twine result in substantially increased mill sorting costs in addition to original costs of the twine.
3. Wools often contain substantial amounts of black fibers. The presence of black fibers intermingled with the fleece wool reduces the value of the clip and restricts the uses which can be made of the fleece.
4. Some types of branding paint used will not wash out, which reduces the quality of the fleece wools.
5. Fleeces contain large quantities of foreign matter, such as straw, chaff, etc., which lower the clip value.

The result of putting up wool which fails in the above respects to meet the requirements of mills is a decrease in the value of the clip. Similar criticisms of current domestic wool put-up methods were noted in a recent study of textile mill specifications for domestic wools.[1]

Textile mills generally appear to prefer buying wool on description where feasible since this reduces cost of purchasing. However, until sufficient wool of uniform quality is available on this basis, buyers may not be willing to offer a premium for such wool.

The domestic methods of preparing and marketing wool have been changed only slightly in recent years. However, textile mills have made many changes. High-speed machinery, more exacting product specifications, and increased consumer selectivity of manufactured products have tended to encourage the use of more exacting raw material specifications.

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[1]Hodde, Walter L., **Wool Marketing Problems,** Farmers Cooperative Service, U. S. Department of Agriculture, General Report 34, June, 1957

In contrast synthetic fiber producers have directed their efforts toward putting out a product which more nearly meets textile mill requirements. A major part of the increased use of synthetics is the result of the success which synthetic fiber manufacturers have had in achieving more fiber uniformity and eliminating supply fluctuations compared with wool producers. Their limited success in copying desired characteristics of wool and in overcoming undesirable characteristics also has contributed to their increased use.

REVISED SHEARING METHOD DEVELOPED

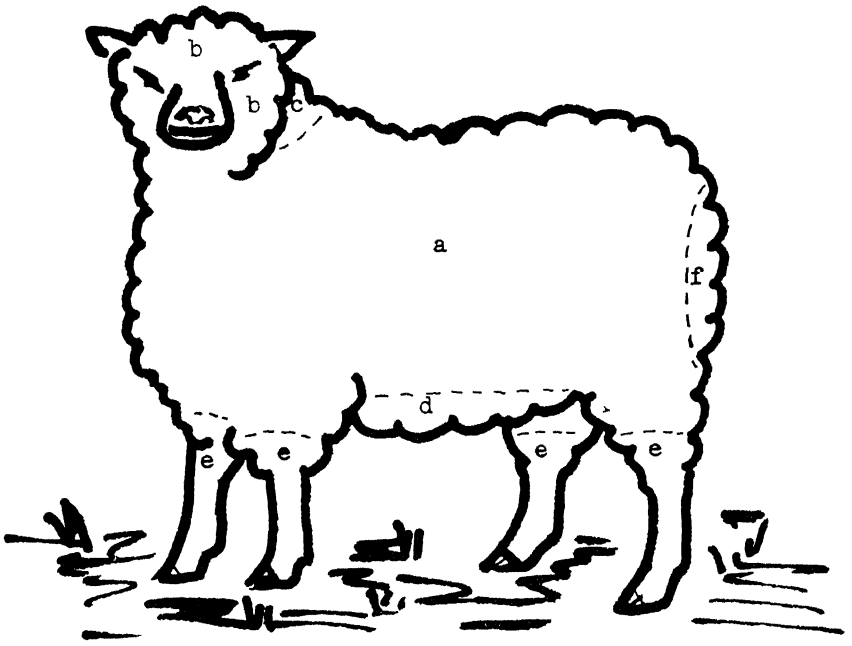
After some experimentation, revisions in the old method of shearing sheep and putting up wool were developed with the objectives of overcoming the mill criticisms previously mentioned and achieving a technique which was practical for professional shearers to use.

The practicability of this procedure as compared with the old method was determined by a controlled experiment involving four professional shearers and 3,100 head of sheep. Four professional shearers were selected and the new method for shearing and putting up wool was demonstrated.[2] Slight modifications were permitted in the procedure used by individual shearers to fit their particular pattern of handling the sheep as long as it did not effect the final wool package.

The primary objective of using the revised shearing method was to remove the stained britch and belly wools, the face and neck wools and the coarse leg wools (Chart A). Generally, this was accomplished by the shearers by first shearing the wool from the belly and the rear legs and pulling this wool from the remaining body wool with the sheep in an upright position. Then, if the face wool and neck wool were seedy, they were shorn and pulled from the body wool. Next the front legs were shorn, and this wool pulled from the body wool. By generally following this procedure, the amount of hair falling in the body wool was minimized. Since the sheep was still in the normal upright starting position, the remaining body wool was easily shorn from the sheep. The remaining offsort—stained and taggy breech wool—was pulled from the fleece

[2]The terms "old method" and "new method" will be found throughout the remainder of this bulletin. The term "old method" refers to the sheep-hearing technique that is currently prevalent throughout the fleece wool states. This is simply tying the fleece, after shearing, with all portions of the fleece included in the package. The term "new method" as used in this bulletin refers to the method under which the wool is sorted as shorn—removing the off-sorts, stained wool, and tags—before the body wool is tied. These terms are intended in no way to infer that one method is more desirable than the other.

before the fleece was bundled and tied. The use of a minimum length of paper twine to tie the fleece (of body wool) was encouraged. Each group of offsort wool was kept separate until the entire fleece was shorn. The separate lots then were bagged loose.



Key: a Body wool. b. Face wool. c. Neck wool. d. Belly wool. e. Leg wool. f. Breech wool.

Chart A.—Major Fleece Divisions as Followed by Shearers.

ANALYSIS OF THE COST AND TIME DATA

Data were collected on all phases of the shearing and marketing operations. Results of the analysis of these data are described in this section.

The total sheepshearing time data for the old method are subdivided into three categories. These are: (1) positioning the sheep for shearing, (2) actual shearing operation, and (3) tying the fleece. Data also were collected for the new shearing method. This has the same functional breakdown as the old method with one addition, sorting the shorn wool before tying. This additional job performed by the sheepshearer constitutes the major difference in costs between the two shearing techniques.

The cost data are based on the amount charged per animal by each sheepshearer and the amount of time used by each sheepshearer. From these data, an indication as to the practicability of adoption by the sheep and wool industry in the fleece wool states is obtained.

POSITIONING THE SHEEP FOR SHEARING

The amount of time spent in positioning the sheep is relatively small in comparison to the total sheepshearing job. This operation was essentially the same for both the old and the new methods of shearing for all the shearers. However, the time taken in completing this operation is important in analyzing the total shearing operation for the following reasons. First, the job of shearing sheep is one which requires a continuous use of considerable physical strength from the time the animal is touched until it is released. The job of positioning the animal is likely to be the peak in requirement of exerted physical energy. Thus, even a small addition to the time figured for this operation for each sheep is likely to make a considerable difference in efficiency, particularly in an eight to ten hour day. Second, the quietness of the sheep has an important effect on the time required to do the actual shearing and the quality of the shearing. This is likely to be affected by the time taken in positioning and ease of doing the positioning.

While shearing using the new method, approximately 1.1 seconds less time was used in positioning the sheep. This difference was not statistically significant.

SHEARING THE SHEEP

The time spent in shearing the sheep comprises the major part of the total time consumed from the moment the sheep is touched until the wool is tied or bagged and the shearer is ready to start on the next sheep.

The sheepshearers selected for this study employed somewhat different techniques in achieving the complete removal of the fleece from the body of the sheep. Shearers B and C used similar shearing techniques, commonly referred to as the Australian method. Shearers A and D used less orthodox methods. Shearers A and D placed the sheep on its hind quarters (sheep in upright position) with the sheep held loosely between the shearers knees. Starting at the head, the shearer clipped the head and neck wools and the front legs and shoulders. He then sheared down the sheep's body, which completed the removal of the body wool. The sheep was then repositioned slightly to facilitate the complete removal of the rump and breech wools.

The change in the method of shearing to remove those parts of the fleece was completed by removing the leg wools, belly wools, if exceedingly dirty and/or short staple, head and neck wools if chaffy or if they contained grey or black hair, and the stained breech and tag wools. When these parts of the fleece are included in the entire fleece, as is currently the practice, this has a definite detrimental effect on fleece value, which in all probability is reflected in grease prices.

The average length of time required for the sheepshearers for the actual shearing operation under the old method ranged from 4.66 to 5.85 minutes. Compared with the average time taken, the variation in times for shearing were relatively small. Shearer C had the smallest variation for any of the lots (Table 1). The highest standard deviation, 1.08 minutes, was recorded by shearer D while using the new method. The amount of variation between sheep was smaller using the new method for three of the shearers and greater for the fourth. The total variation within lots was slightly smaller for the old method, 0.467; but the difference was not significant.

The differences between means of time taken by different shearers for the various operations were tested using "Students t-test." The results show that two shearers required significantly less time to shear using the new method. When the times for all four shearers were combined, the average difference was only 0.04 minutes. This is not statistically significant.

TABLE 1.—Summary of Average Time Used, Variation in Average Time Used, Standard Error of Mean, and Mean Difference of Time Used in Shearing Sheep, Selected Sheepshearers, By Method, Ohio, 1957

Shearers	Time Used		Standard Deviation		Standard Error of Mean		Mean Difference(b)
	Old	New	Old	New	Old	New	
	(Minutes)						
A	5.85	4.98	0.903	0.664	0.202	0.157	3.40 * †
B	4.72	3.26	0.559	0.426	0.125	0.110	8.79 * † ‡
C	4.76	5.25	0.706	0.298	0.158	0.077	2.73 * †
D	4.66	6.29	0.710	1.076	0.158	0.254	5.45 * † ‡
Average(a)	4.99	4.95	0.533	0.467	----	----	----

(a) Simple Arithmetic Average.

(b) Key:
* Significance at 0.05 level.
† Significance at 0.01 level.
‡ Significance at 0.001 level.

SORTING

No sorting operation was involved for the old method. The complete fleece generally was tied into one bundle. However, in some cases the tags were bagged separately by the farmer. The time the farmer spent doing this was not recorded, since generally this job was not done until the end of the day.

Table 2 shows the time data on the sorting operation.

The average time required for sorting for all of the shearers under the new method was 57.45 seconds.

TABLE 2.—Summary of Average Time Used, Standard Error of Mean and Standard Deviation of Time Used to Sort Off-Sort Wool, Selected Sheepshearers, New Method, Ohio, 1957. (In Seconds)

Shearers	New Method		
	Average Time Used	Standard Error of Mean	Standard Deviation
A	12.8	0.67	2.85
B	132.2	8.10	31.38
C	52.9	4.34	16.81
D	31.9	1.93	8.18
Average(a)	57.45	----	----

(a) Simple Arithmetic Average.

TYING THE FLEECE

Using the new method the body wool was tied in the same manner as the total fleece using the old method. However, using the new method, most of the loose ends previously had been "sorted out". As a result, it was expected that slightly less time would be required.

Table 3 shows the average time required and the standard deviations, and mean difference for the tying operations.

Shearer D was the only one who took longer on the average to tie, using the new method. He averaged approximately 5.5 seconds longer. Shearer C was the only one who showed a significant difference in average tying time for the two methods. He cut his time for tying by 15.7 seconds using the new method as compared with the old.

The average difference in time for all the shearers was 4.78 seconds less using the new method.

TABLE 3.—Summary of Average Time Used, Standard Deviation and Mean Difference of Time Used in Tying Fleece Wool, Selected Sheepshearers, by Method, Ohio, 1957. (In Seconds)

Shearer	Time Used		Standard Deviation		Mean Difference(b)
	Old	New	Old	New	
A	42.6	38.6	10.19	6.85	1.77
B	51.2	48.5	9.12	5.66	1.09
C	50.3	34 6	4.95	4.48	9.79 * † ‡
D	36.0	41.6	6.40	8.30	1.70
Average(a)	45.02	40.80	----	----	----

(a) Simple Arithmetic Average.

(b) Key:
* Significance at 0.05 level
† Significance at 0.01 level
‡ Significance at 0.001 level.

DIFFERENCE IN TOTAL COST FOR THE TWO METHODS

The time analysis showed that it took slightly less time in performing the three operations (positioning, shearing, and tying) for the new method. This average difference was 1/10 of a minute. However, when the time required for sorting for the new method was added to this, the total time required averaged 5/6 of a minute more for the new method.

The difference in time primarily was found to be in sorting and tying, both of which are quite similar in the amount of effort required per minute of work on the operation. Both of the operations are lower in energy output per minute than positioning or shearing. The actual time and cost differences for the total shearing operation are shown below:

Operation	Time difference (In Seconds)	Cost difference (In Cents)
Positioning	— 1.1 less for new	—0.1375 less for new
Shearing	— 0.04 less for new	—0.0050 less for new
Tying	— 5.78 less for new	—0.7225 less for new
Sorting	+57.45 more for new	+7.1812 more for new
Net Difference	+50.53 more for new	+6.3162 more for new

These data show a cost difference of 6.3 cents per fleece (per sheep shorn) to shear using the new method.

COSTS IN WAREHOUSE

Fleece Wools—

After the shearing and sorting process was completed at each of the cooperating farms, each farm operator consigned his wool clip to the Ohio Wool Growers Cooperative, Columbus, Ohio. The Ohio Wool Growers Cooperative served as the collection agency for the project wool as well as the marketing agency. Also, they served as the sorting and grading agency.

Approximately two-thirds of the graded wool fell in the worsted class, by American grade. This grouping totaled 14,728 pounds. Sixteen percent, 3,632 pounds, fell in the woolen class, and nearly 7 percent, 1,557 pounds, fell in the pieces class. The remaining 11 percent were rejects.

The cost of grading the fleece wool, based on a grader wage rate of $2.50 per hour, was 19 cents per hundredweight (Table 4). This cost compares favorably with the costs now incurred by graders presently employed at the Ohio Wool Growers Cooperative while grading their regular consignments of wool.

Off-Sort Wool—

The amount of time to grade and cost per hundredweight of wool graded was approximately 67 cents per hundredweight. This cost appears to be high. However, it should be pointed out that the ratio of

TABLE 4.—Cost of Grading Fleece Wools and Off-Sorts Wools, by Lot and by Hundredweight, Selected Consignments, Ohio Wool Growers Cooperative, Columbus, Ohio, 1957

Lot Number	Fleece Wools			Off-Sorts		
	Weight of Wool Graded (Pounds)	Cost to Grade Lot (Dollars)	Cost per Cwt. to Grade Wool (Cents)	Weight of Wool Graded (Pounds)	Cost to Grade Lot (Dollars)	Cost per Cwt. to Grade Wool (Cents)
A	457	0.64	14.0	151	1.10	73.0
B	674	1.28	19.0	478	2.15	45.0
C	1590	4.66	29.0	672	6.12	91.0
D	583	0.99	17.0	124	0.82	66.0
E	692	0.41	6.0	197	1.74	88.0
F	162	0.23	14.0	64	0.41	64.0
G	318	0.76	24.0	10	0.12	12.0
H	557	0.82	15.0	224	0.47	21.0
I	370	0.41	11.0	70	0.35	50.0
Total	5403	10.20	19.0*	1990	13.29	67.0*

*Weighted Average.

the amount of off-sort wool, 4,050 pounds, to the fleece wool, 18,360 pounds, is low. This cost must be added to the total cost of preparing this wool for market, which is 1.03 cents per fleece. Therefore, the total cost of shearing and grading wool using the new method totals 7.3 cents per fleece.

PROJECT WOOL MARKET RETURNS

Method of Sale—

The lot of project wool was shipped to National Wool Marketing Corporation, Boston, Mass., by the Ohio Wool Growers Cooperative, Columbus, Ohio, and each classification or grade of project wool was

TABLE 5.—Amount and Percentage Distribution of Project Wool Consigned to Ohio Wool Growers Cooperative, by Grade, Columbus, Ohio, 1957

Grade	Pounds	Percent of Total
Worsted System		
Delaine	117	.522
Fine Staple	2,410	10.759
½ Blood	1,696	7.571
⅜ Blood	6,879	30.710
¼ Blood	3,064	13.679
Low ¼	500	2.232
Common and Braid	62	.277
Sub Total	14,728	65.750
Woolen System		
Fine French	1,083	4.835
½ French	828	3.696
⅜ French	1,230	5.491
¼ French	491	2.192
Sub Total	3,632	16 214
Worsted Pieces (Staple Wool)		
⅜ Blood	480	2.143
¼ Blood	1,077	4 808
Sub Total	1,557	6.951
Rejects		
Crutchings	1,072	4.786
Medium Seedy and Burry	1,183	5.281
Medium Grey, Cotted, Pulled, Common and Short	228	1.018
Sub Total	2,483	11.085
TOTAL	22,400	100.000

sold (Table 7). As the prospective buyers who are purchasing wool for their respective textile mill uses became available, the salesmen of the National Wool Marketing Corporation explained to these buyers the methods used in preparing this wool for market. Their salesmen attempted to obtain the highest possible sale price for the various grades of wool. Therefore, several months lapsed before all the various grades were sold (Table 7).

The percentages contributed by each of the various grades of the project wool to the total pounds of wool consigned to National Wool Marketing Corporation are found in Table 5. As the actual pounds of wool in each lot was relatively small and, to some extent, due to newness of the method of this type of fleece wool put-up, the salesmen of the National Wool Marketing Corporation felt that the true worth of some of the grades were not obtained. This is particularly noticeable in the 3/8 and 1/4 staple pieces and common and braid grades.

TABLE 6.—Grading and Sorting Project Wool: Time, Amount and Average Time Required to Grade Fleece Wools, and Time, Amount, and Average Time Required to Sort and Grade Off-Sort Wools, Selected Consignments, Ohio Wool Growers Cooperative, Columbus, Ohio, 1957

Lot Number	Fleece Wool			Off-Sort Wool		
	Grading Fleeces	Weight of Wool Graded	Average Pounds Graded per Minute	Grading Wool in Lot	Weight of Wool	Average Number Pounds Graded
	(minutes)	(pounds)	(pounds)	(minutes)	(pounds)	(per minute)
A	11	457	41.545	19	151	7.947
B	22	674	30.636	37	478	12.919
C	80	1,590	19.875	105	672	6.400
D	17	583	34.294	14	124	8.857
E	7	692	98.857	30	197	6.567
F	4	162	40.500	7	64	9.143
G	13	318	24.462	2	10	5.000
H	14	557	39.786	8	224	28.000
I	7	370	52.857	6	70	11 667
Total	175	5,403	382.812	228	1,990	96.500
Average*		30.87*	42.53		8.728*	10.720

*Weighted Arithmetic Average, in pounds per minute.

TABLE 7.—Actual Returns of Project Wool Consigned to National Wool Marketing Corporation by Ohio Wool Growers Cooperative, by Grade, Boston, Massachusetts, 1958

Grade	Date of Sale	Grease Price Received (in cents)	Actual Returns (in dollars)
Worsted (Staple) System			
Delaine	5/12/58	50	$ 58.50
Fine Staple	5/23/58	54	1,310.40
½ Blood	4/ 1/58	51	864.96
⅜ Blood	4/ 8/58	48½	3,336.32
¼ Blood	5/ 8/58	46	1,409.44
Low ¼	5/12/58	45	225.00
Common and Braid	8/ 6/58	44	27.28
Sub Total			$7,231.90
Woolen (Clothing) System			
Fine French	5/22/58	46	$ 498.18
½ French	5/22/58	47	389.16
⅜ French	4/ 9/58	41	504.30
¼ French	5/19/58	40	196.40
Sub Total			$1,588.04
Worsted (Staple) Pieces			
⅜ Blood	9/30/58	24	$ 115.20
¼ Blood	9/30/58	25	269.25
Sub Total			$ 384.45
Rejects			
Crutchings	8/ 4/58	25	$ 268.00
Medium Burry and Seedy	5/ 7/58	36	414.12
Medium Grey, Cotted, Pulled, Common and Short*	5/17/58	26–35	73.94
Sub Total			756.06
Total	--------	------	$9,960.45

*Range of prices received for all rejects other than crutchings.

However, common and braid is not important in terms of quantity produced in Ohio. The prices received for the main sorts were generally above the average weekly price except where the lowest shrink (highest price) is considered (Table 7 and 8). Then, this occurred only in the ¼ blood staple and ⅜ and ¼ french grades.

Seedy and burry wools under the present method of marketing will not command a market value equaling their contribution to the total grease weight of any lot of wool.

The prices received for crutchings (tags) which contributed 4.79 percent of the total grease weight of this lot of wool were about as expected. This weight was not excessive.

Estimated and Actual Market Returns—

In order to compare the returns from the project wool as sorted with like quantities of unsorted wool, it was assumed that the project wool was equal to the sum of the main grade sorts and the "pieces" classes (Table 7). (Normally, wool marketed from Ohio Wool Growers is sorted into the main grades as well as the Clothing and French grades.)

For the purpose of this comparison, the French grades were added to their counterpart grade in the main sort. This step is justified by the fact that the estimated price ranges obtained from the **Weekly Review of the Boston Wool Market,** makes no differentiation between clothing and staple wools.

It was also assumed that an equal portion of each fleece was removed by the sheepshearers at the farm when the shearing process was being performed. Thus, the "pieces" grades were added to the main grades in equal proportion to the weight in each main grade (Table 8).

The estimated total returns for Ohio wools in like quantities and grades of the project lot of woods are found in Table 8. The total estimated returns were calculated in three levels of estimated shrink- -low, medium, and high—with the total estimated returns at $10,184.26, $9,631.53, and $9,206.69 for these three shrink levels, respectively. The actual dollar returns for the project lot of wool totaled $9,960.45. This yields a gross gain of $223.81, $328.92 and $753.76 respectively for the three shrink levels.

The range which Ohio wools shrink on the average are as follows: Ohio Delaine, 59-60 percent; Fine, 53-55 percent; ½ Blood, 53-55 percent; ⅜ Blood, 47-48 percent; and ¼ Blood, 44-46 percent.[3] These estimates generally correspond to the medium shrink level in Table 8. Based on these estimated shrinks the project wool yielded an increase of $328.92 in gross return.

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[3]Getz, Paul A., Manager, Ohio Wool Growers Cooperative, Columbus, Ohio. Based on average shrink of these grades of wools handled by Ohio Wool Growers Cooperative.

TABLE 8.—Estimated Returns for Unsorted Wool Equivalent in Actual Pounds to Project Wool Sold, Based on Minimum Average and High Shrink of Grades Involved, Boston, Massachusetts, 1958*

Wool Grade	Number of Pounds	Date Sold	Low Shrink		
			Estimated Shrink	Price Grease Basis	Total
Delaine	126	5/12/58	55	54	$ 68.04
Fine	3,790	5/23/58	59	46.5	1,762.35
½ Blood	2,739	4/ 1/58	55	46.5	1,273.64
⅜ Blood	8,797	4/ 8/58	44	49.0	4,310.53
¼ Blood	3,856	5/ 8/58	42	45.0	1,735.20
Low ¼ Blood	542	5/12/58	40	45.5	246.61
Common and Braid	67	8/ 6/58	39	47.5	31.83
Rejects	2,483	5/17/58	--	----	756.06
TOTAL	22,400				$10,184.26

Wool Grade	Number of Pounds	Date Sold	Medium Shrink		
			Estimated Shrink	Price Grease Basis	Total
Delaine	126	5/12/58	61	47.5	$ 59.85
Fine	3,790	5/23/58	63	41.5	1,572.85
½ Blood	2,739	4/ 1/58	57	44.0	1,205.16
⅜ Blood	8,797	4/ 8/58	47	46.5	4,090.61
¼ Blood	3,856	5/ 8/58	44	43.5	1,677.36
Low ¼ Blood	542	5/12/58	42	44.0	238.48
Common and Braid	67	8/ 6/58	40	46.5	31.16
Rejects	2,483	5/17/58	--	----	756.06
TOTAL	22,400				$ 9,631.53

Wool Grade	Number of Pounds	Date Sold	High Shrink		
			Estimated Shrink	Price Grease Basis	Total
Delaine	126	5/12/58	64	43.0	$ 54.18
Fine	3,790	5/23/58	66	38.5	1,459.15
½ Blood	2,739	4/ 1/58	60	41.0	1,122.99
⅜ Blood	8,797	4/ 8/58	50	44.5	3,914.67
¼ Blood	3,856	5/ 8/58	46	42.5	1,638.80
Low ¼ Blood	542	5/12/58	44	42.5	230.35
Common and Braid	67	8/ 6/58	41	45.5	30.49
Rejects	2,483	5/17/58	--	----	756.08
TOTAL	22,400				$ 9,206.69

*Estimated prices and shrink by grade were obtained from Market News, Livestock Division, **Weekly Review of the Boston Wool Market,** A.M.S., U.S.D.A., Boston, Massachusetts, on respective dates that various grades of project wool were marketed.

Source: Table 5.

Note: The market returns for rejects were the same for both methods. Both were made on a grease basis.

Cost of Preparation and Marketing—

The rejects from the project wool (Table 7) are identical to the rejects from the non-project wool and commanded the same price.

As stated earlier, the total additional cost to shear, grade and sort the project wool using the new method compared with the old was 7.3 cents per fleece or $226.30. This subtracted from the estimated increase in returns for the project wool yields a net gain of $102.62. This is approximately 0.5 cents net per pound of wool handled.

Transportation and selling costs were the same for wool under both methods of preparation used.

Conclusions—

The results of this study suggest that an improvement in the method of putting up wool in Ohio is economically feasible. However, a substantial amount of supervision of shearers will be required to obtain statewide uniformity in procedure. The greater variation in wool quality which may be expected if the method is applied over the entire state will increase the difficulty in obtaining uniformity. Some preliminary separation of fleeces may be desirable. For example, some of the lower quality fleeces such as seedy and burry and black fleeces should be handled separately at the farm.

Observations at the farms visited suggest that along with improvement in method of putting up the wool there is need for general improvement in method of handling the sheep to provide better quality wools.

In many cases, farmers were not aware of the recommended practices needed for improving wool quality. However, because of the relatively small importance attached to the sheep enterprise, farmers often did not want to take the time or did not feel the returns justified the effort.

Unfortunately, buying practices followed in some areas actually return less to a farmer who turns out clean fleeces compared with the farmer who turns out a fleece which has more weight because it has a relatively high percentage of foreign matter. There is a need to provide more realistic market incentives to the farmer for putting up a better quality clip.

Results of this experiment have demonstrated that skirting by shearers at the farms can be economical under fleece wool conditions. However, there is need to compare these results with results using other alternatives, particularly that of sorting the wool at a centrally located warehouse.

GLOSSARY OF TERMS

Breech wool---------- Wool, usually the coarsest in the fleece, from the lower parts of the hindquarters.

Burry wool---------- Wool that contains burrs from any plants. Fine burry, medium burry refer to the grade of wool.

Clean basis---------- Quotations of prices that are based on the estimated weight of fiber after removal of the grease and foreign matter.

Clip ---------- The weight or type of wool from all of the sheep in a particular area. The area included maybe a single farm, county, state, nation, or the entire world.

Cotts---------- Those fleeces having fibers matted or felted.

Crutchings ---------- Wool shorn from the breech and inside the hindlegs. Also may refer to wool shorn from these areas before the regular shearing as a part of the flock management.

Dead wool---------- Wool removed from dead sheep. This does not include wool from slaughtered sheep.

Domestic wool---------- Wool produced in this country in contrast to foreign grown wool.

Fleece wools---------- A trade term for wool grown in the eastern and central states. More specifically this includes all wool grown under farm conditions as opposed to territory wools which refers to wool grown under ranch conditions.

Grade---------- A means of designating wool according to fineness of fiber. A further subdivision of grade includes such factors as length of fiber, and amount and type of foreign matter.

Grease wool---------- Wool in the form as just shorn, not scoured.

Locks ---------- Pieces of wool loosened from the main fleece.

New method---------- (of putting up wool) as used in the bulletin refers to the revised method developed early in the study under which the shearer does a certain amount of sorting during the farm shearing operation.

Off-sorts---------- Fleeces or parts of fleeces that are removed from regular lots of graded wools because they differ in some major characteristic such as color, length, fineness, foreign matter, etc.

Old method---------- As used in the bulletin refers to the method of shearing and putting up the fleece as commonly used in Ohio and other fleece states at the time this study was being made.

Put-up ---------- Term used in wool trade describing methods used in preparing wool for sale or marketing.

Quality wool or quality clip-- Used to describe wool that has low shrinkage, no manure tags, low vegetable matter content, limited off-sorts and little coarse or short fibers.

Rejects ---------- Fleeces or parts of fleeces that are not suitable for regular lots of graded wools because of being badly stained, having undesirable color, etc.

Shrinkage---------- The percentage loss in gross weight as grease and foreign matter are removed in the scouring process.

Skirting---------- Removing the inferior and heavy shrinking parts of a fleece before it is marketed

Sorting ..... Dividing the fleece into its various qualities.

Stained wool ..... Wool that has been stained by urine or manure to the extent that it cannot be scoured to a white color.

Tags ..... Heavy manure—covered wool locks.